

C-1

Transmission and Distribution

Cambridge, Massachusetts



Street View

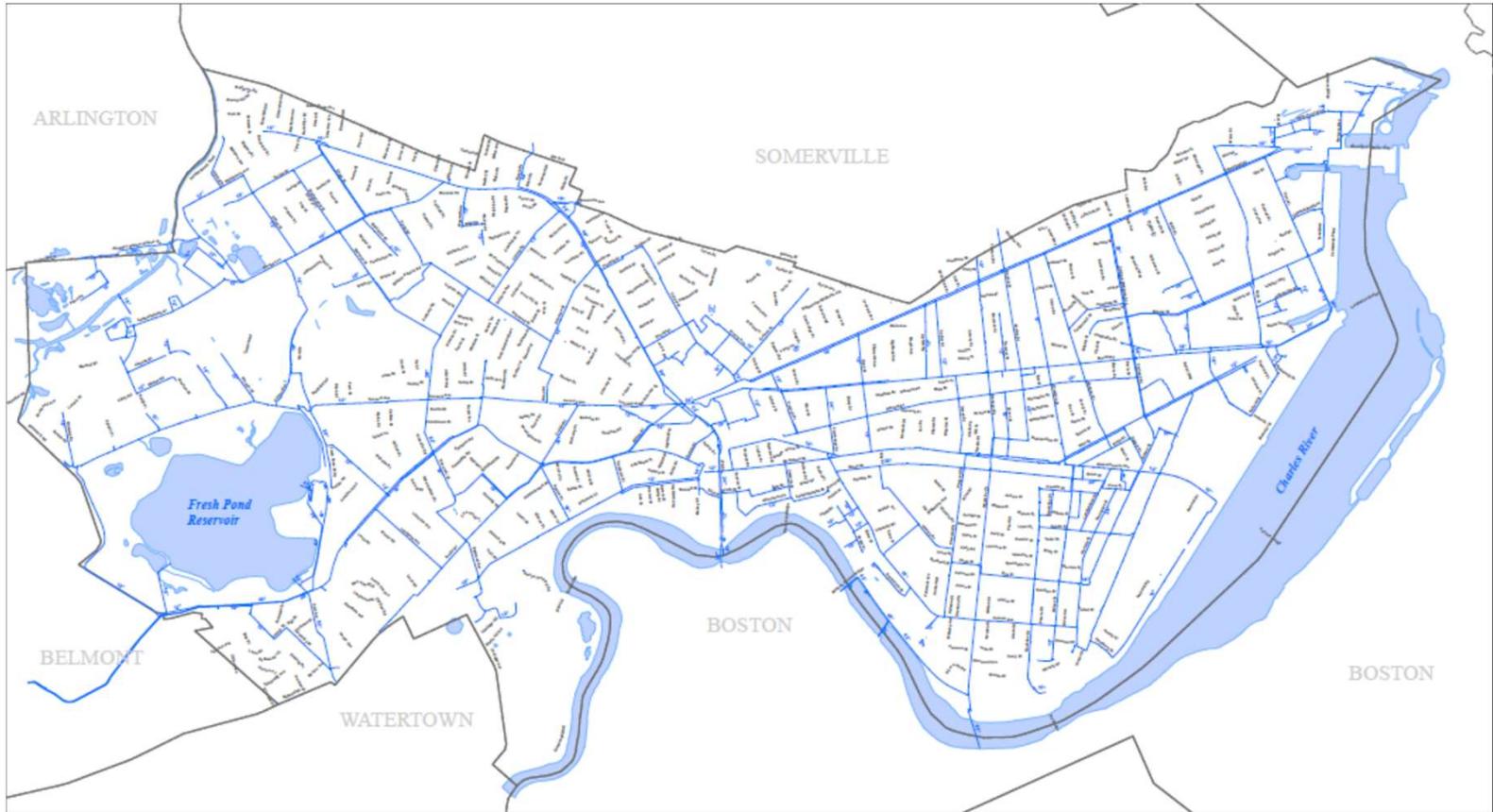


CAMBRIDGE WATER WORKS



Google





CITY MANAGER
ROBERT W. HEALY

MAYOR
DAVID P. MAHER



Scale 1" = 800 Feet

CITY OF CAMBRIDGE
Schematic of Pipes 10" or Greater in Diameter

WATER BOARD
ANN C. ROOSEVELT, PRESIDENT - JAMES BURRUSS - RICHARD JOHNSON - PAUL D. ROBILARD - PHILLIP WEINBERG

MANAGING DIRECTOR
STEPHEN S. CORDA

10/14/11 10:00 AM

10/14/11 10:00 AM

10/14/11 10:00 AM

2012



CAMBRIDGE
TRANSMISSION
AND
DISTRIBUTION
SYSTEM

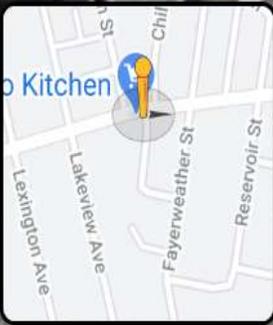
Consists of approximately
210 miles of pipe ranging
from 4” – 63”

Active Pipe Install dates
range from 1864-Present

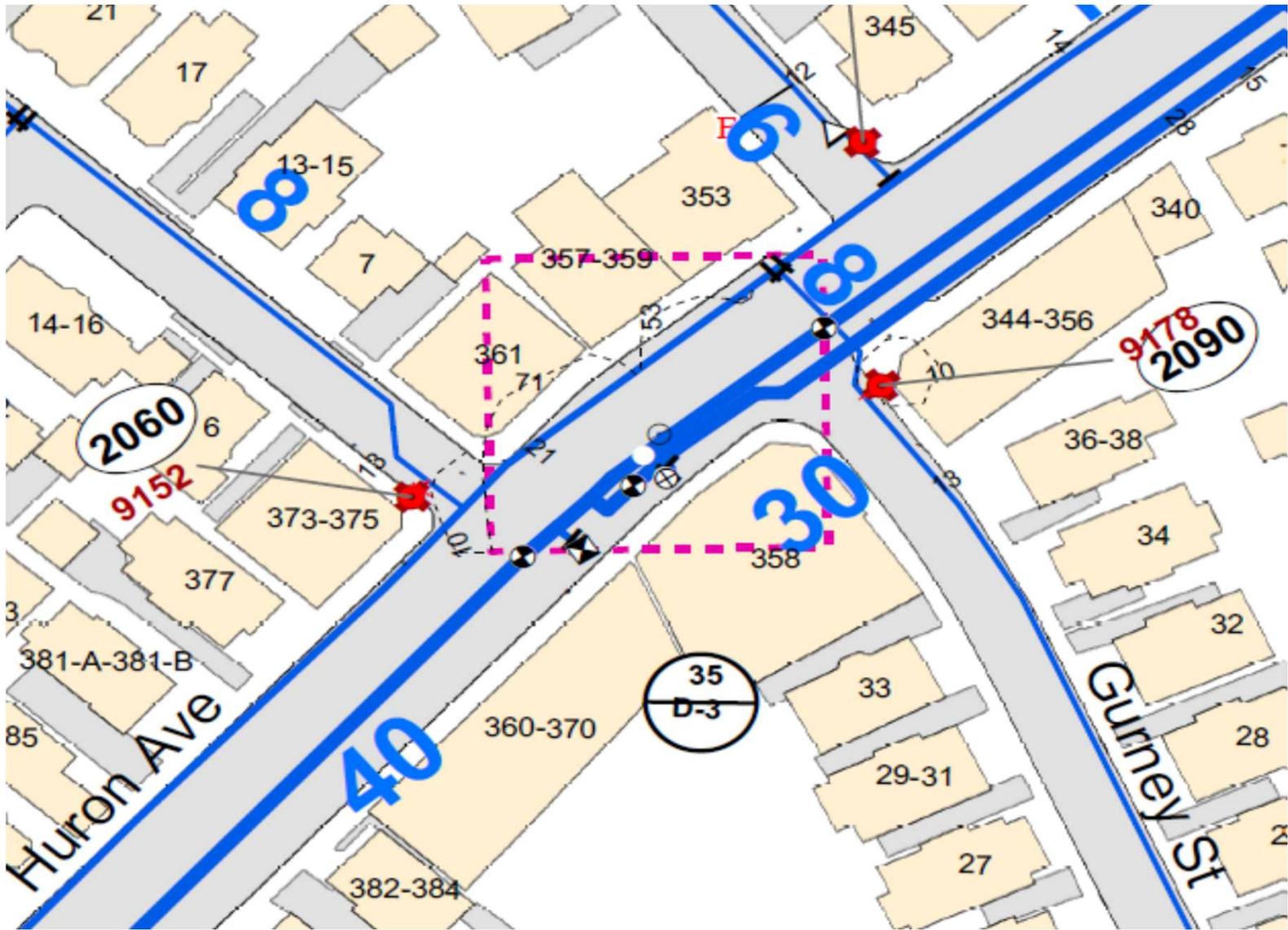
357 Huron Ave
Cambridge, Massachusetts

Google

Street View



Google



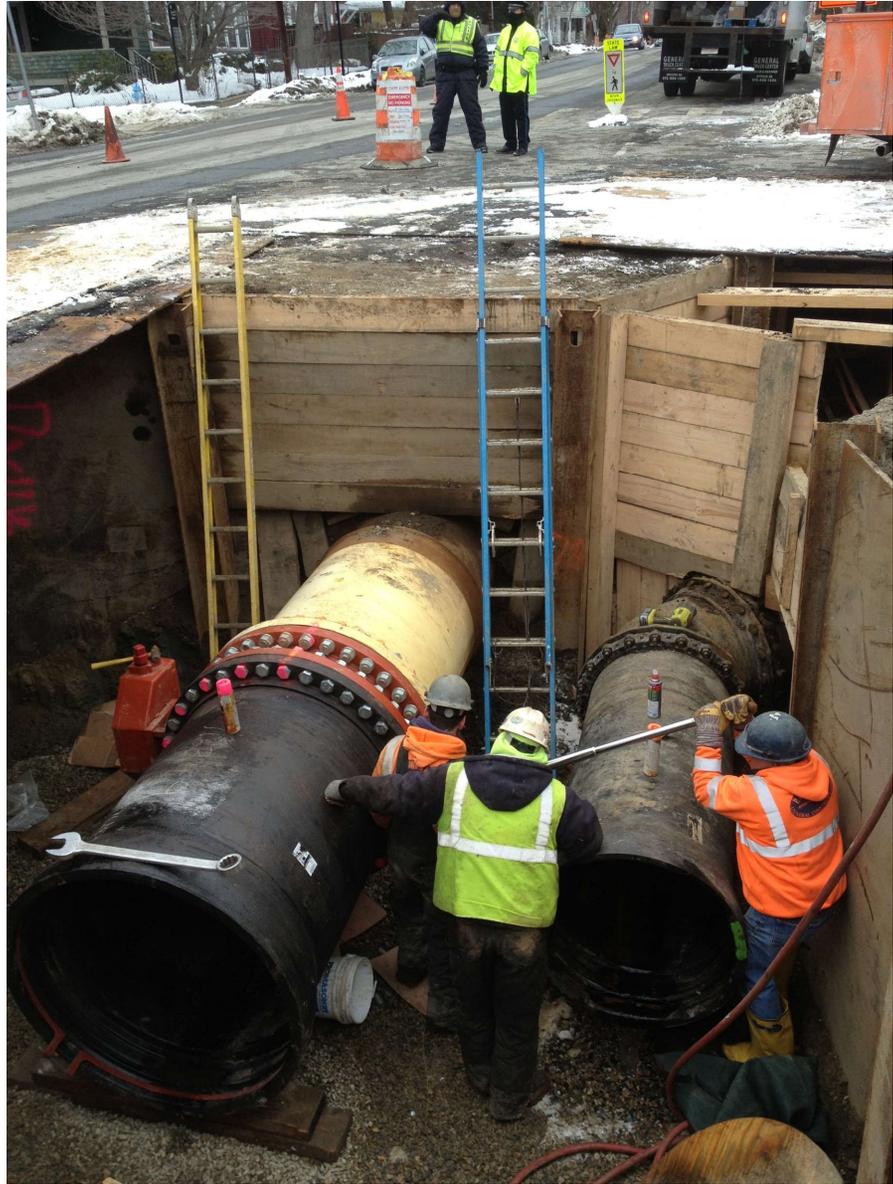




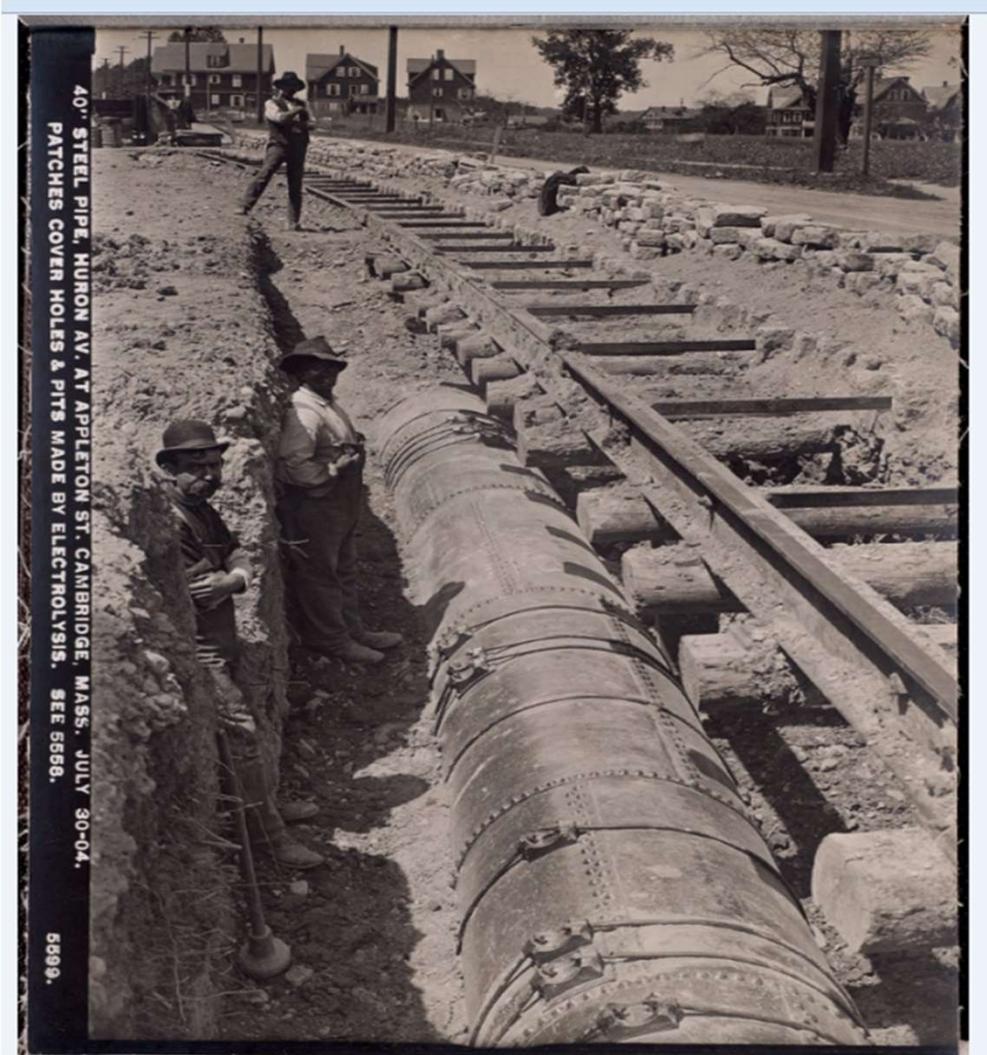












40" STEEL PIPE, HURON AV. AT APPLETON ST. CAMBRIDGE, MASS. JULY 30-04.
PATCHES COVER HOLES & PITS MADE BY ELECTROLYSIS. SEE 5658.

5699.

DISTRIBUTION LEAKS

The American Society of Civil Engineers (ASCE) estimates that there are approximately 240,000 water main leaks each year in the United States alone. (Which I believe is a low estimate)

The Water Research Foundation estimates that on average most water systems have approximately 0.25 leaks per foot of water main per year.

When you add up the numbers ASCE estimates that in the US over 2 Trillion gallons of clean treated water are lost through distribution leaks each year.

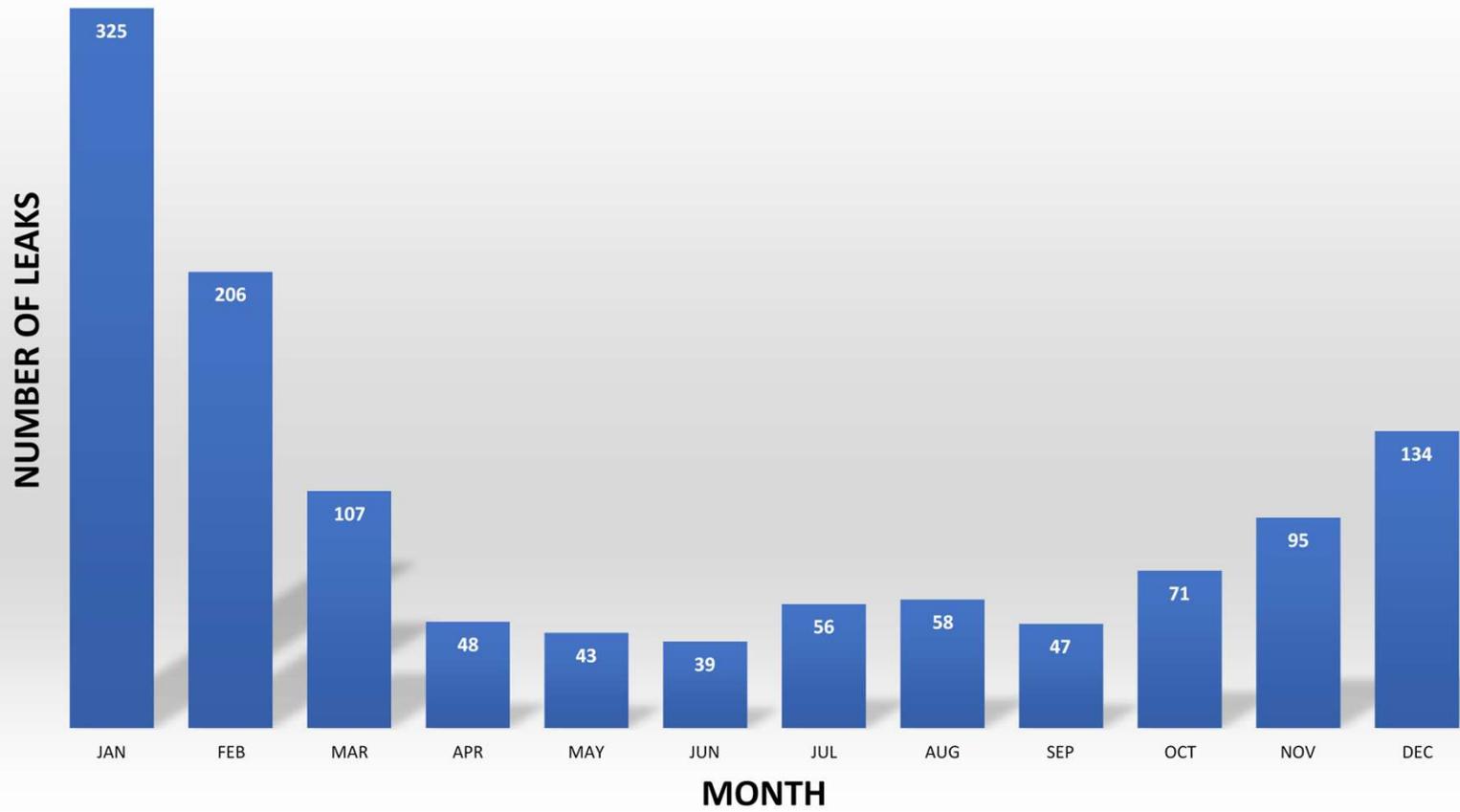
C. OPERATIONS - Transmission and Distribution

- Continue working with and supporting DPW regarding sewer separation, Chapter 90 and Common Manhole Removal Contracts.
- Scheduling lead water service replacements within DPW Contracts 22 and 23.
- Working with DPW and contractors on several water main projects that include:
- **North Point Extension:** Working with private development contractor overseeing the installation of approximately 4660' of new water main to support the construction of the North Point Extension with new streets, housing and commercial space. Work to include all new valves, hydrants and water services.
- **Monsignor O'Brien Hwy – Greenline Extension Project.** Working with McCourt utility contractor, relocating and upgrading portions 2000' old CI 8, 10 and 12" water main with new 12" DICL pipe to include all valves, hydrants and services.
- **Centre St:** CWD crew continued installing approximately 700' of new 8" water main to include all valves, hydrants and services.
- **Inman Square Roadway Improvement Proj.** Includes water main work in portions of Hampshire St, Cambridge St, Springfield St, Beacon St, Ashland St. and Oak St. Work to include all valves hydrants and services.
- **Snow Operations:** 2/1, 2/7, 2/10 Snow Plowing and Snow Removal for all CWD Buildings and Properties. Provide Staff and equipment to support DPW City wide snow operations.

February 2021

16	Leaks repaired
0	Services renewed/reconnected
3	Hydrants repaired/replaced
148	Valves exercised
156	Inspections performed
347	Utility mark outs
18	Work orders completed
0	Valves replaced/repared
0	Miscellaneous jobs

LEAKS PER MONTH 2003-2019







LEAK TERMINOLOGY

LEAK VS BREAK

- **LEAK - IS REPAIRABLE IN-SITU**

I.E. RADIAL CRACK, LEAKING JOINT

- **BREAK - CRITICAL FAILURE**

I.E. PIPE RUPTURE, MECHANICAL FAILURE

MAIN LEAK vs SERVICE LEAK

- **MAIN LEAKS** – A MAIN IS A SECTION OF PIPE ON THE DISTRIBUTION OR TRANSMISSION SYSTEM
- **SERVICE LEAKS** – A SERVICE IS A LATERAL SECTION OF PIPE EXTENDING FROM THE DISTRIBUTION PIPE INTO A PROPERTY



SERVICE LEAKS

TWO BASIC TYPES

- INTERNAL
- EXTERNAL

INTERNAL

- Typically called in by property owner or facilities management
- Standard CWD response is to send one inspector to shut off valve in the street. Usual time on site is less than 30 minutes
- Property owner hires plumber to make repair
- When complete CWD inspector returns to turn water back on in the street



EXTERNAL

- Typically, little to no water showing
- Per City Ordinance Property owner is responsible for repair
- Exception – Lead Service Lines – CWD will renew
- Usually found by leak detection or by Residents and Passersby



MAIN LEAKS

TWO BASIC TYPES

- LEAK
- BREAK

LEAK

- Typically, little to no water visible
- Often found by leak detection or called in by a passerby
- CWD responsible to repair















BREAK

- Typically, a lot of water showing with potential flooding
- High potential for street, sidewalk and property damage
- Often reported by Police, Fire, Plant Staff and Passersby
- CWD responsible for repairs







LIVE



HAPPENING NOW

FOX 25 WATER MAIN BREAK

7:32 66°

CAMBRIDGE - HARVARD SQUARE

TOP STORIES

ING NEWS TEAM. IT'S FRIDAY, SEPTEMBER 4, 2015











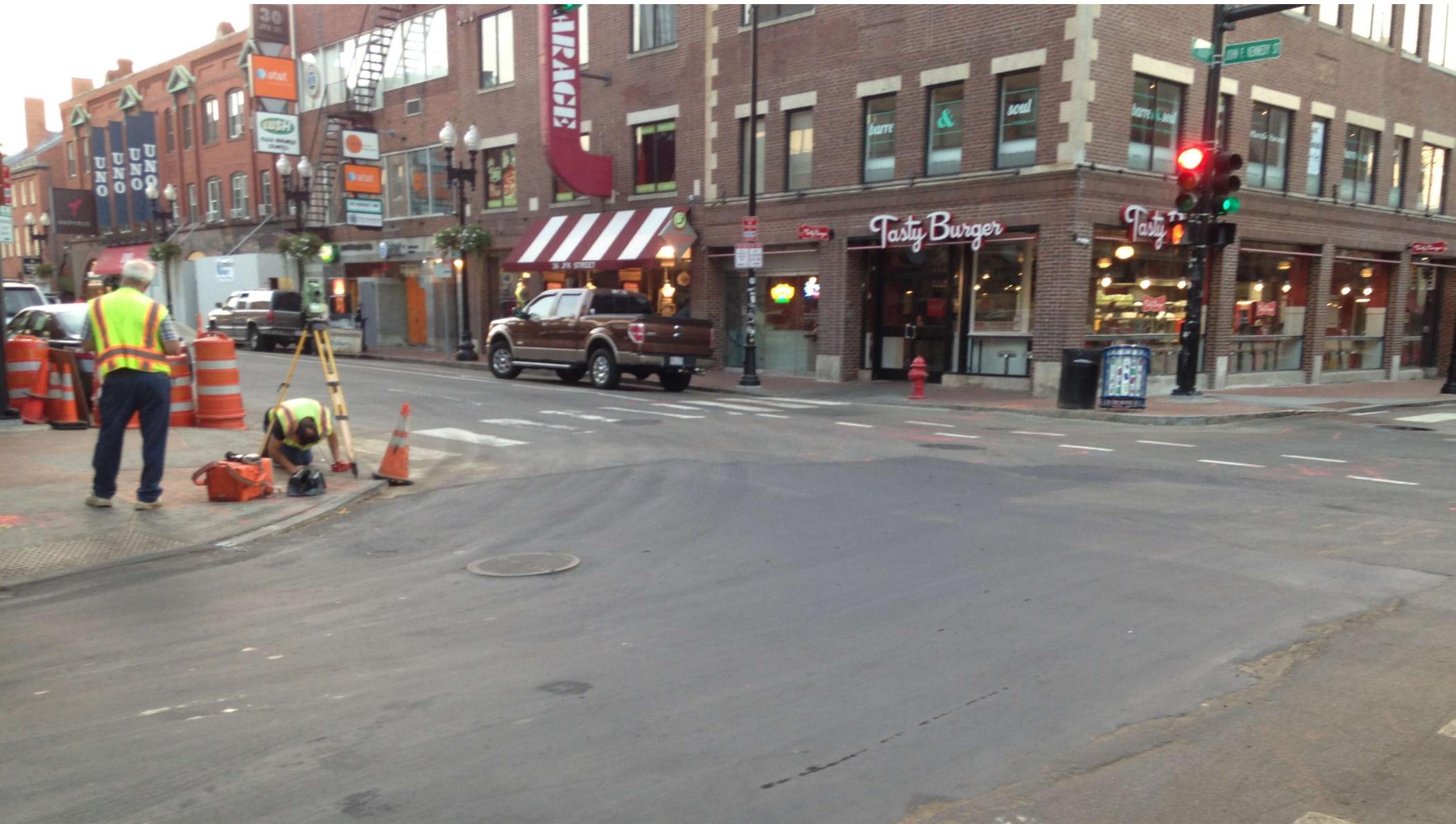












D'ALLESSANDRO CORP.

41 LEDIN DRIVE
 PO BOX 245
 AVON MASSACHUSETTS 02322-0245
 Phone 508-559-6400 - Fax 508 559 6432

EXTRA WORK ORDER REQUEST

City of Cambridge
 147 Hampshire Street
 Cambridge, MA 02139

Extra Work Order Request No. 1
 "INVOICE DATE 9/9/2015
 Contract No. 35.844
 Project Manager

JOB NAME/LOCATION

Harvard Square-Emergency Water Main Repair
 Mt. Auburn Street @ JFK Street
 Cambridge, MA

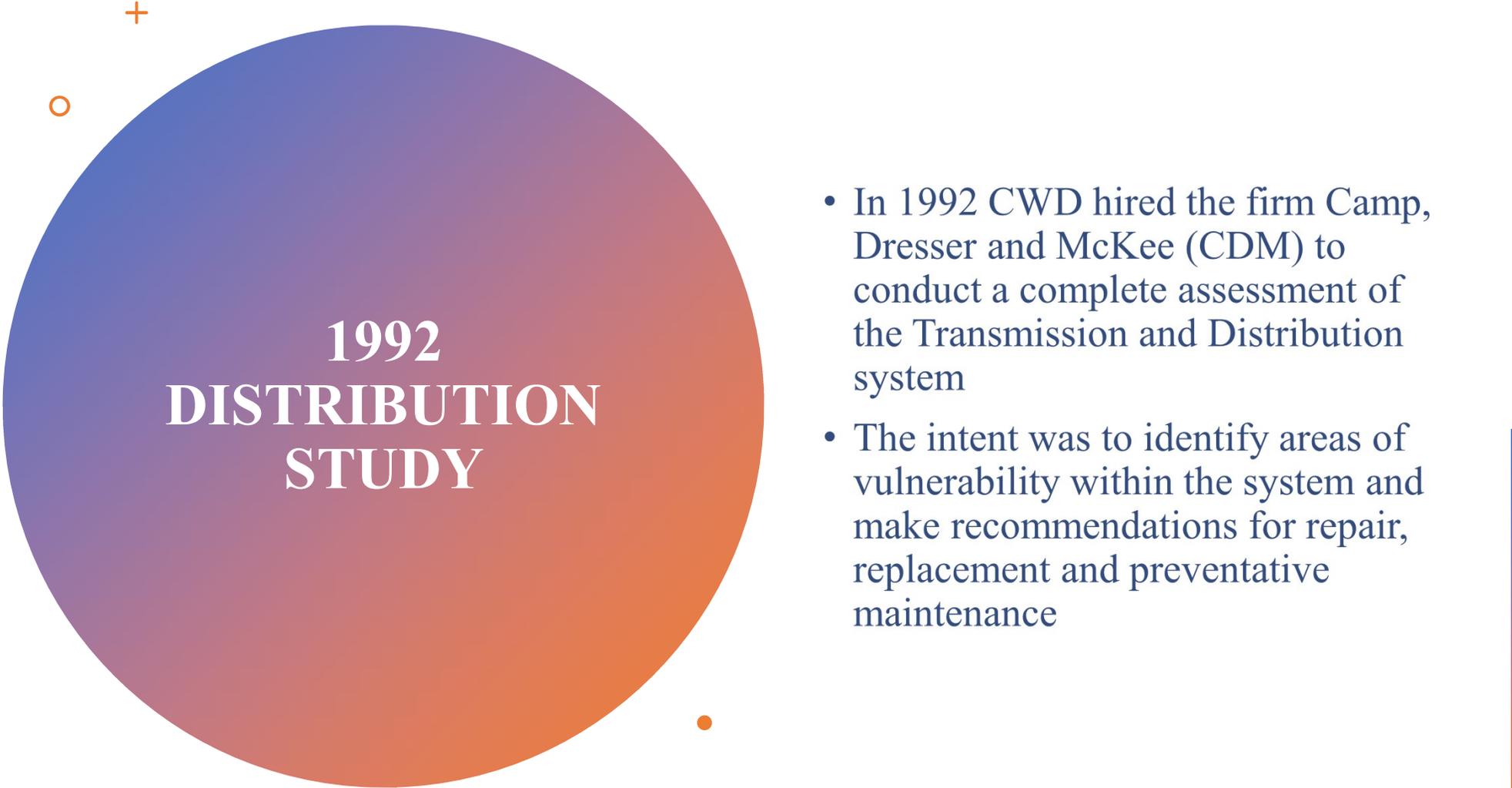
QUANTITY	DESCRIPTION	UOM	QUANTITY/HR	RATE	AMOUNT	TOTALS
	<i>We are Requesting a Change Order be Issued for the following:</i>					
Desc:	For the time and materials costs associated with the emergency repair of the 12" water main at the intersection of Mt. Auburn Street and JFK Street.					
	Service Date: 9/4-6/2015					
Labor	<i>Crew #1 3PM-6AM (9/4-9/5)</i>					
1	Supervisor (Overtime)	HRS	25	\$ 135.00	\$ 3,375.00	
1	Foreman (Overtime)	HRS	15	\$ 112.50	\$ 1,687.50	
1	Operator (Overtime)	HRS	23	\$ 101.16	\$ 2,326.68	
1	Driver (Overtime)	HRS	15	\$ 79.02	\$ 1,185.30	
1	Laborer (Overtime)	HRS	50	\$ 83.40	\$ 4,170.00	
	<i>Crew #2 5AM-530PM (9/5)</i>					
1	Supervisor (Overtime)	HRS	10	\$ 135.00	\$ 1,350.00	
1	Foreman (Overtime)	HRS	12.5	\$ 112.50	\$ 1,406.25	
1	Operator (Overtime)	HRS	19	\$ 101.16	\$ 1,922.04	
1	Driver (Overtime)	HRS	18.5	\$ 79.02	\$ 1,461.87	
2	Laborer (Overtime)	HRS	12.5	\$ 83.40	\$ 2,085.00	

1	Gravel	TN	180.5	\$	12.00	\$	2,166.00	
1	16x12 Reducer	EA	1	\$	180.60	\$	180.60	
1	16" DI Pipe	LF	20	\$	56.42	\$	1,128.40	
1	Poly wrap	RL	1	\$	275.00	\$	275.00	
1	Cold Patch	TN	5	\$	81.00	\$	405.00	
1	12" PVC	LF	13	\$	7.15	\$	92.95	
1	12" Ductile Iron	LF	20	\$	39.06	\$	781.20	
1	Drain Manhole	EA	1	\$	1,401.00	\$	1,401.00	
1	1' Manhole Riser	EA	2	\$	52.00	\$	104.00	
1	Cement	BG	2	\$	13.40	\$	26.80	
1	Frame and Cover	EA	1	\$	268.94	\$	268.94	
1	Gate Box	EA	1	\$	75.00	\$	75.00	
1	Flow Fill	CY	6	\$	136.00	\$	816.00	
1	Flow Fill Saturday Delivery Fee	LS	1	\$	100.00	\$	100.00	
								\$ 10,875.34
SubCntr						\$	-	
	Subcontractor Total:							\$ -
	Sub Total (Labor, Burden, Equipment & Materials)							\$ 68,684.46
		Overhead & Profit			20%			\$ 13,736.89
								\$ 82,421.35
						Sub Total		\$ 82,421.35
						Performance & Payment Bond	1%	\$ 824.21
Signature:						TOTAL		\$ 83,245.56



WHAT'S BEING DONE

PROACTIVE vs REACTIVE



1992 DISTRIBUTION STUDY

- In 1992 CWD hired the firm Camp, Dresser and McKee (CDM) to conduct a complete assessment of the Transmission and Distribution system
- The intent was to identify areas of vulnerability within the system and make recommendations for repair, replacement and preventative maintenance

CRITERIA USED FOR WATERMAIN ASSESSMENT

- **Fire flow capacity**
- **Leak History**
- **Water Quality Issues**
- **Age and pipe material**

MAJOR STUDY FINDING

Approximately 75% of all leaks and fire flow issues were found on old 6" unlined cast iron mains

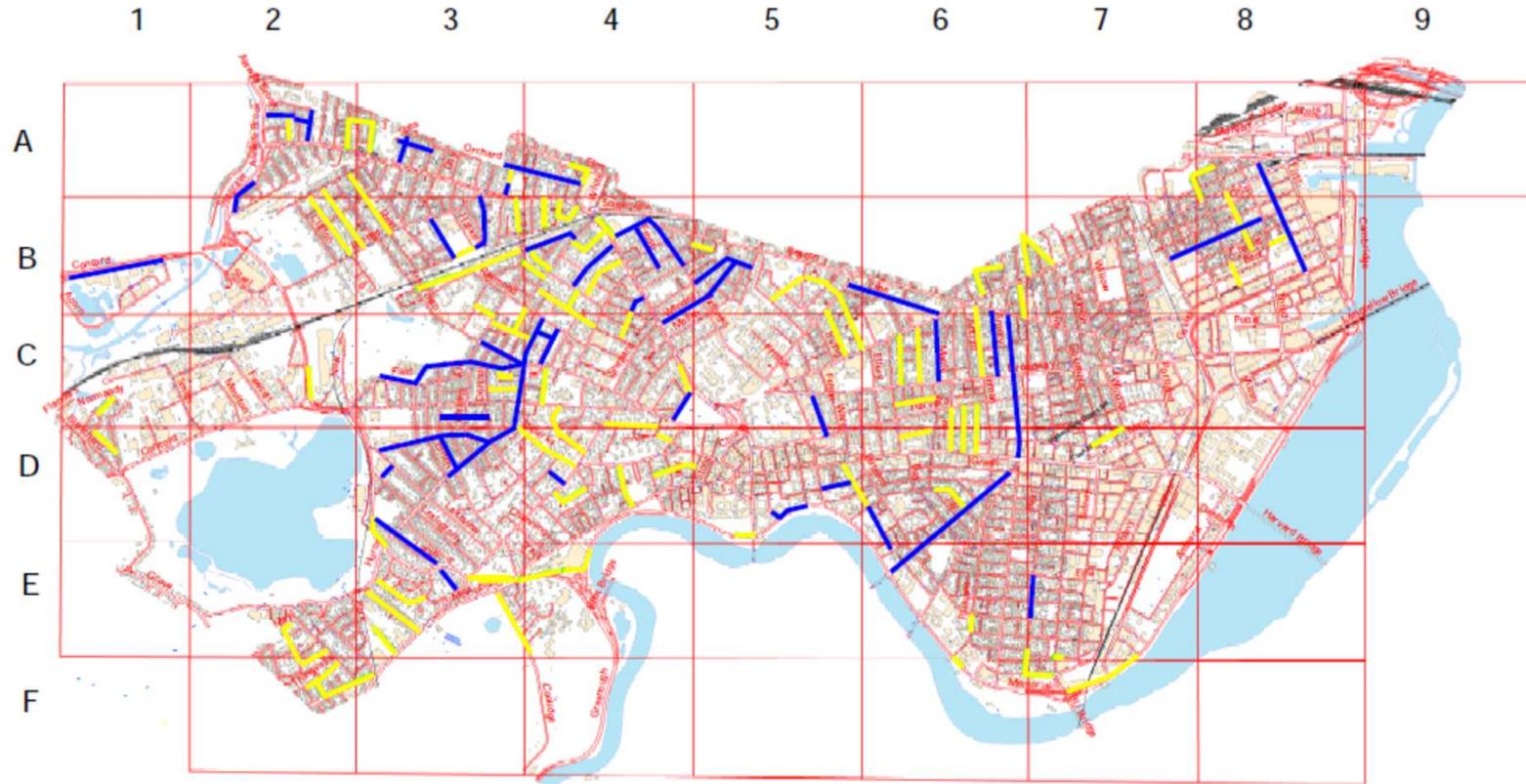
CDM produced a list recommending the replacement of approx. 77 miles of 6" main to be replaced with 8" Cement lined Ductile Iron

Using their assessment criteria, they divided that list into three separate priority sections.

SMALL DIAMETER WATER MAIN PRIORITY REPLACEMENT STATUS
FROM 1992 DISTRIBUTION STUDY

	ORIGINAL LENGTH (Miles)	LENGTH REPLACED (Miles)	PERCENT COMPLETE
PRIORITY 1	8.27	5.37	65
PRIORITY 2	6.85	3.59	52.4
PRIORITY 3	11.34	4.89	43.2
TOTAL	26.46	11.86	52.4

1992 Distribution Study - Small Diameter Priority Water Main Replacement Status - All Phases



— Needs to be Done
— Completed

CWD HAS SPENT APPROX \$100M SINCE 1995

MILES OF NEW WATER MAIN INSTALLED 1992 - 2020

SIZE	FT OF MAIN	MILES
4	1617.78	0.31
6	17048.02	3.21
8	117659.12	22.29
10	15705.55	3.57
12	75355.97	14.28
16	8336.73	1.58
20	483.18	0.09
24	897.69	0.17
30	2534.31	0.48
36	2241.88	0.42
40	2904.31	0.55
42	4259.78	0.81
48	533.25	0.10
TOTALS	249577.57	47.86

LEAK COMPARISON BY YEAR

